COURSE OUTLINE

GENERAL

SCHOOL	Sciences and Engineering		
ACADEMIC UNIT	Computer Science		
LEVEL OF STUDIES	1st Cycle		
COURSE CODE	COMP-421	**SEMESTER**	Fall
COURSE TITLE	Compiler Design		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	2.5	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialization
PREREQUISITE COURSES:	COMP-270, COMP-321
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A
● *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
● *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
● *Guidelines for writing Learning Outcomes*

After completion of the course students are expected to be able to:
● analyze the various stages of the basic language translation process (lexical, parsing, code generation, optimization) and machine-dependent vs. machine-independent aspect of translation
● discuss the underlying formal models such as finite state automata and their connection to language definition through regular expressions and grammars
● assess and use parsing techniques, including LL(1) and LR parsers
● translate statements into three-address code
● analyze the properties of a variable and discuss type incompatibility

- analyze and use static vs. dynamic storage allocation and the usage of activation records to manage program modules and their data.
- given an intermediate representation, along with symbol table information, produce a semantically equivalent target program
- design and implement a simple language translator using automated tools, such lexical and parser generators lexx/yacc.

General Competences
Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Project planning and management
Production of free, creative and inductive thinking

SYLLABUS

- Overview of Compilation
- Lexical Analysis, including regular expressions, finite automata (NFA, DFA), implementation of lexer using automated tools
- Syntax Analysis, including context-free grammars, top-down parsing, bottom-up parsing, implementation of a parser using automated tools
- Syntax-directed translation
- Type Systems
- Intermediate representations (graphical and linear)
- Code optimization and generation

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	*Use of ICT in teaching / Χρήση ΤΠΕ* *Communication with students / Επικοινωνία με Φοιτητές*
TEACHING METHODS *The manner and methods of teaching are described in detail.*	<table><tr><td>***Activity***</td><td>***Semester workload***</td></tr><tr><td>Lectures</td><td>35</td></tr></table>

Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.	Preparation, exercises	43
	Project	50
	Exam preparation	20
	Final exam	2
The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	Course total	**150**

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final Exam, Midterm Exam, and Semester Project

(1) ATTACHED BIBLIOGRAPHY

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Compilers: Principles, Techniques, and Tools (2nd edition)	A. V. Aho, M. Lam, R. Sethi, and J. D. Ullman	Pearson Education	2007	978-0321486813

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Engineering a Compiler (3rd Edition)	K. Cooper and L. Torczon	Morgan Kaufmann	2022	978-0128154120
Modern Compiler Design (2nd Edition)	D. Grune, K. van Reeuwijk, H. E. Bal, C. J.H. Jacobs, K. Langendoen	Springer	2012	978-1461446989